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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/862,551	05/22/2001	Narayanan Venkitaraman	CR00251M	1292

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EXAMINER

PATEL, ASHOKKUMAR B

ART UNIT	PAPER NUMBER
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2154

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/862,551

Applicant(s)

VENKITARAMAN ET AL.

Examiner

Ashok B. Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 11-23 is/are rejected.
- 7) ☒ Claim(s) 7-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Claims 1-23 are subject to examination.

Response to Arguments

2. Applicant's arguments filed December 20, 2004 have been fully considered but they are not persuasive for the following reasons:

Applicant's argument:

The Applicant respectfully traverses this anticipation rejection of claims 1-6 and 11-13, because Pittabhiraman fails to teach or suggest the following limitations of independent claims 1, 21 and 22:

1. "updating a threshold utility as a function of the average queue length and the rate at which the queue length is increasing", and "processing the packet based on the threshold utility" as recited independent claim 1; and

2. "means for updating a threshold utility as a function of the average queue length and the rate at which the queue length is increasing, and means for processing the packet based on the threshold utility" as recited independent claims 21 and 22.

A careful review of Pittabhiraman reveals the fact that Pittabhiraman fails to teach or suggest any of the three aforementioned thresholds 520, 522 and 524 being updated as a function of average queue length 542 and a rate at which a queue length 540 is increasing as required by the aforementioned limitations of independent claims 1, 21 and 22.

Examiner's response:

The reference teaches at page 6, para.[0067], "Queue manager 420 informs bandwidth manager 440 of the instantaneous queue length for each queue. Bandwidth manager 440 computes a time average (i.e., smoothed version) of the queue length for each channel and determines the bandwidth requests it sends to the arbiter based on these averaged queue lengths. In this embodiment, bandwidth manager 440 samples the actual queue length every t time units, and computes an average according to $\text{average}[n+1] = (1-w) * \text{average}[n-1] + w * \text{length}[n]$, where w is the weight of the new sample length, and n being a counter of the number of updates." Thereby the reference does teach "determining an average queue length for the queue; and determining a rate at which a length of the queue is increasing."

And, the reference teaches what the arbiter does at page 4, para.[0055], "Arbiter 170 processes the bandwidth requests and informs nodes 120 of the resulting bandwidth allocation associated with each dynamic channel."

Thus the reference teaches the limitations of claims 1, 21 and 22.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless-

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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4. Claims 1-6, and 11-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Pattabhiraman et al. (hereinafter Pattabhiraman) (US 2002/0059408).

Referring to claim 1,

The reference teaches a method of operating a core router (Page 4, para. [0056], "In this embodiment, node 121, the arbiter node, optionally includes the functionality hosted at non-arbiter nodes 120, and if so also makes internal requests of arbiter 170 related to allocation of capacity for its inbound channels."), comprising:

receiving a packet into a queue;

determining an average queue length for the queue; (page 6, para.[0067])

determining a rate at which a length of the queue is increasing; (page 6, para.[0067], "A queue manager 420 manages a queue 42 for each inbound dynamic channel, and provides queue length information to bandwidth manager 440.", page 2, para[0023],

Monitoring the data rates for each communication channel include monitoring a size of a queue of data accepted for each channel that is pending transmission over the shared medium and generating the requests to change the data rate assignment for that channel using the monitored size of the queue.", page 6, [0068], "The top graph of the figure shows a typical instantaneous queue length 540 for a queue 422 associated with a dynamic channel.")

updating a threshold utility as a function of the average queue length and the rate at which the queue length is increasing; and processing the packet based on the threshold utility. (page 4, para.[0058], "Management of the dynamic channels involves both provisioning of channels, which includes admission (creation) and termination of

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channels to the shared channel, as well as bandwidth management of the admitted channels, which includes allocation and deallocation of bandwidth within the shared channel to the admitted channels.”, page 6, para.[0068])

Referring to claims 2 and 3,

The reference teaches the method of claim 1, wherein the average queue length is the arithmetic mean size of the queue calculated over a plurality of time intervals (page 6, para[0067]), and wherein the average queue length is determined by exponentially averaging the queue length. Determination of average queue length by exponential averaging is well known in the art.

Referring to claim 4,

The reference teaches the method of claim 1, wherein the rate at which the queue length is increasing is determined by calculating the difference between queue lengths during consecutive time intervals and dividing by a length of the time interval. (page 6, para. [0067], “Queue manager 420 informs bandwidth manager 440 of the instantaneous queue length for each queue. Bandwidth manager 440 computes a time average (i.e., smoothed version) of the queue length for each channel and determines the bandwidth requests it sends to the arbiter based on these averaged queue lengths.”)

Referring to claims 5,

The reference teaches the method of claim 1, wherein the queue lengths are virtual queue lengths. (page 6, para. [0067], “Queue manager 420 informs bandwidth manager 440 of the instantaneous queue length for each queue. Bandwidth manager 440

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computes a time average (i.e., smoothed version) of the queue length for each channel and determines the bandwidth requests it sends to the arbiter based on these averaged queue lengths." Thereby, the reference teaches that every queue length has its virtual queue lengths.)

Referring to claim 6,

The reference teaches the method of claim 1, wherein the step of updating the threshold utility further comprises:

increasing the threshold utility by an increment factor when the average queue length is greater than an upper queue length threshold; increasing the threshold utility by an increment factor when the rate at which the queue length is increasing is greater than an increasing rate threshold; (page 6, para.[0068], "Bandwidth manager 440 receives the instantaneous queue length 540 from queue manager 420 and computer a time average queue length 542 according to the averaging formula described above. When the average queue length exceeds a configurable threshold, ALLOCTH 520, bandwidth manager 440 sends a bandwidth requests 164 to arbiter 170 in each frame to increase the bandwidth allocation for that dynamic channel."), and

decreasing the threshold utility by a decrement factor when the average queue length is less than a lower queue length threshold, and the rate at which the queue length is decreasing is greater than a decreasing rate threshold. (page 6, para.[0068], "When the average queue length is below ALLOCTH, bandwidth manager 440 sends a bandwidth requests 164 to arbiter 170 to decrease the bandwidth allocation for the channel.")

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Referring to claim 11,

The reference teaches the method of claim 1, wherein the step of processing the packet comprises: determining an incremental packet utility corresponding to the received packet; comparing the threshold utility with the incremental packet utility; and processing the packet based on the comparison of the threshold utility with the incremental packet utility. (page 6, para. [0067], "Each packet arriving at a rate between CIR and BR is tagged by policer 450 as "droppable" by setting a bit in the packet's header. Packets arriving at a rate less than or equal to CIR are forwarded as is without setting the "droppable" bit. Congestion manager 430 uses the droppable bit information to enforce congestion management.")

Referring to claim 12,

The reference teaches the method of claim 11, wherein the step of processing the packet further comprises forwarding the packet in the queue. (page 6, para. [0067], "Each packet arriving at a rate between CIR and BR is tagged by policer 450 as "droppable" by setting a bit in the packet's header. Packets arriving at a rate less than or equal to CIR are forwarded as is without setting the "droppable" bit. Congestion manager 430 uses the droppable bit information to enforce congestion management.")

Referring to claims 13 and 14,

The reference teaches the method of claim 12, wherein the step of forwarding the packet in the queue comprises:

determining a current queue length for the queue;

forwarding the packet in the queue if the current queue length and the average queue length are less than a lower queue threshold; and

forwarding the packet in the queue if the incremental packet utility is greater than or equal to the threshold utility and the current queue length is less than a maximum queue length." (page 6, para.[0068], Fig.5)

Referring to claim 15,

The reference teaches the method of claim 14, wherein the step of dropping the packet in the queue comprises: determining a current queue length for the queue; dropping the packet in the queue if the current queue length or the average queue length is greater than or equal to the lower queue threshold, and the incremental packet utility is less than the threshold utility; and dropping the packet in the queue if the current queue length is greater than or equal to a maximum queue length. (page 6, para.[0068], Fig.5, para.[0069])

Referring to claim 16,

The reference teaches the method of claim 11, wherein the step of processing the packet in the queue further comprises modifying the incremental packet utility based on the received packet. (page 2, para.[0016], "The requests to change the data rate assignments for each communication channel include requests to increase an assigned data rate for the channel and requests to decrease the assigned data rate for the channel. The data rate assignments are repeatedly recomputed using the received requests.")

Referring to claim 17,

The reference teaches the method of claim 16, wherein the step of modifying the incremental packet utility further comprises decrementing the incremental packet utility by the value of the threshold utility. (page 5, para.[0063] and [0064]).

Referring to claims 18 and 19,

The reference teaches the method of claim 1, wherein the step of updating is done at a periodic time interval, and wherein the step of updating is done at a time interval based on the reception of packets into the queue. (Page 2, para.[0018] and [0023]).

Referring to claim 20,

The reference teaches the method of claim 1, further comprising: broadcasting the threshold utility to one or more hosts. (page 4, para.[0055], "Arbiter 170 processes the bandwidth requests and informs nodes 120 of the resulting bandwidth allocation associated with each dynamic channel.")

Referring to claim 21,

Claim 21 is a claim to a computer-usable medium storing a program for operating the core router of claim 1. Therefore claim 21 is rejected for the reasons set forth for claim 1.

Referring to claim 22,

Claim 22 is a claim to a system for operating the core router of claim 1. Therefore claim 22 is rejected for the reasons set forth for claim 1.

Referring to claim 23,

Claim 23 is a claim to a system of claim 20. Therefore claim 23 is rejected for the reasons set forth for claim 20.

Allowable Subject Matter

Referring to claims 7, 8, 9, and 10,

Claims 7-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ashok B. Patel whose telephone number is (571) 272-3972. The examiner can normally be reached on ***.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *** can be reached on ***. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Abp


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